FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3

PROGRAM ELEMENT: 0603794N
PROGRAM ELEMENT TITLE: C3 Advanced Technology

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1999 ACTUAL	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2091 Space and Electronic Warfare (SEW) Advanced Technology	20,240	21,903	21,228	22,170	22,273	22,196	21,871	CONT.	CONT.
R2239 Advanced Targeting (C3I)	5,541	1,776	8,445	3,735	3,390	5,800	5,844	CONT.	CONT.
R2601 Dominant Battlespace Command Initiative	2,905	5,967	0	0	0	0	0	0	8,872
R2602 National Technology Alliance	14,528	9,945	0	0	0	0	0	0	24,473
R2575 National Advanced Telecommunications and Applications Center	0	1,989	0	0	0	0	0	0	1,989
TOTAL	43,214	41,580	29,673	25,905	25,663	27,996	27,715	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) develops Command, Control and Communications (C^3) technologies which enhance battle targeting for naval forces in Navy, Joint and Coalition operations. The tasking of this PE is executed in accordance with the Information Technology Management Reform Act (ITMRA) of 1996. This PE has been restructured to support the Navy's high priority technology needs for Navy implementation of network centric warfare and Joint Vision 2010. Primary products include technology for dynamic, reconfigurable, secure, radio frequency networks; high data rate, radio frequency communications; multi-function apertures; high assurance systems; distributive, collaborative, planning and execution; complex information processing support for deliberate precision weapons engagements; and algorithms for specific target identification.

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(U) This PE primarily supports the following Joint Mission Areas and Support Areas: Land Attack (comprised of precision strike and naval surface fire support functions), Amphibious Warfare, Information Warfare, Anti Air Warfare, Maritime Dominance, Theater Ballistic Missile Defense and Readiness/Training. The focus is on development and demonstrations of next-generation C^3 systems with high quality and certifiable quality of service to support joint war fighting operations, involving land units, ships, aircraft, and submarines. C^3 capabilities in the 21st century are key to the success of all aspects of military operations including force level planning and rehearsal quality as well as unit level battlespace awareness and weapons engagement execution.

1. (U) SEW Advanced Technology (X2091) -- This project is pursuing work in dynamic, reconfigurable, secure, radio frequency networks; high data rate, radio frequency communications; multi-band wireless RF network physical layers and multi-function apertures. Efforts will develop:
(a) Low observable, high data rate apertures. Ships, aircraft and submarines in the 21st century must have signature controlled apertures to enhance operational effectiveness. Apertures must provide connectivity between satellites, ships, aircraft and submarines and land units.

2. (U) Advanced Targeting (R2239) -- This project is pursuing evaluation of current and emerging technologies to improve communications, surveillance and targeting capabilities for airborne, ground, and shipbased forces.
(a) The Precision Sigint Targeting System (PSTS) is a Joint Service/Defense Agency effort to develop and demonstrate the capability to provide tactical users with near-real-time target identification and precision targeting information, sensor-to-shooter target updating, and Battle Damage Assessment. PSTS will enhance the tactical utility/applicability of existing national assets and provide the tactical commander with performance improvements in terms of targeting accuracy, targets of interest, timeliness, and target identification. Technical challenges include development of advanced signal processing and data fusion algorithms for target detection and classification; and exploitation of multiple signal characteristics for specific emitter identifications.
(b) The advanced multifunction radio frequency (RF) system will provide the capability to radiate and receive

arbitrary communications, electronic warfare, and radar waveforms from common apertures which will reduce the plethora of antennas on Naval platforms, reduce life cycle costs, increase stealth characteristics of platforms, and enhance the effectiveness of the RF capabilities of the platforms for warfighting.

3. (U) Dominant Battlespace Command (R2601) – This project is pursuing evaluation of visualization software and computer technologies to improve battle space awareness, shorten the command and control decision-making cycle and interface with existing C4ISR systems, data links, and networks. Efforts include: networks that will provide the Command and Control (C2) operator with a real time interactive 3 dimensional (3D) visualization of the battlespace; timely and dynamic management of intelligent, surveillance and reconnaissance (ISR) resources; and rapid and dynamic replanning.

4. (U) National Technology Alliance (R2602) – This project is pursuing identification and application of current and emerging satellite, commercial and consumer technologies to enhance Naval warfighting systems performance and capability while reducing costs. Navy decision-makers need to understand the impact of these technologies in order to employ the best solutions, plot a technology development course, and map out procurement strategies. The end result will be to develop systems that will support joint and future naval operations in the 21st Century by providing seamless access to tailorable information for warfighters, planners, decision makers and analyst at all echelons.

5. (U) National Advanced Telecommunications and Applications Center (R2725): Funds provided for NATAC will be used to develop new telecomunications capabilities and information technology for use by naval forces.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is budgeted within the Advanced Technology Budget Activity because it encompasses design, development, simulation, or experimental testing of prototype hardware and software to validate technological feasibility and concept of operations and reduce technological risk prior to initiation of a new acquisition program or transition to an ongoing acquisition program.

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BUDGET ACTIVITY: 3

PROGRAM ELEMENT: 0603794N
PROGRAM ELEMENT TITLE: C3 Advanced Technology

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1999	FY 2000	FY 2001
FY 2000 President's Budget	39,686	23,808	29,015
Appropriated Value		41,808	
Inflation Savings	-183		
Congressional Rescissions		-228	
Congressional Plus Ups		18,000	
Various Rate Adjustments			-1,100
Execution Adjustment	4,466		
SBIR/STRR Adjustment	-755		
Program Adjustment			1,758
FY 2001 PRESBUDG Submission	43,214	41,580	29,673

(U) CHANGE SUMMARY EXPLANATION:

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3

PROGRAM ELEMENT: 0603794N
PROGRAM ELEMENT TITLE: C3 Advanced Technology

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1999 ACTUAL	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2091 Space and Electronic Warfare (SEW) Advanced Technology	20,240	21,903	21,228	22,170	22,273	22,196	21,871	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project demonstrates advanced technology components, subsystems and systems that will improve the Navy's management and operational use of time-critical command, control communications, computers, intelligence sensors and reconnaissance (C4ISR) data with certifiable assurance functionality, hig data rates, optimization and automation of network resources, multi-level access and security of databases and the ability t transmit and receive multi-media data (voice/data/video) over high data rate communication circuits. Capabilities realize from these efforts will contribute to the Navy's ability to maintain an accurate situation assessment and tactical pictur with required accuracy and timeliness to allow all forces to have detailed knowledge of the battlespace. This project restructured to support the Navy’s high priority technology needs for Navy implementation of network centric warfare and Join vision 2010. Primary technology focus areas include dynamic reconfigurable secure radio frequency networks, high data rate radio frequency communications, and multi-function apertures.

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DATE: February 2000

BUDGET ACTIVITY: 3

PROGRAM ELEMENT: 0603794N

PROGRAM ELEMENT TITLE: C3 Advanced Technology

PROJECT: X2091

PROJECT TITLE: (SEW) ADVANCED TECHNOLOGY

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

- (U) HIGH ASSURANCE SYSTEM: The focus of this technology is verification and validation of mission critical systems.
  - Initiated design to integrate additional surveillance info into Intelligence (INTEL) system initiated by Army.

- (U) MULTI-FUNCTION APERTURES: This technology addresses a unique Navy need for improved antenna aperture, reduced radar cross-section, and reduced numbers of shipboard antennas.
  - Completed design UHF&L, K&Q Band Planar Phased Array SATCOM antennas.
  - Initiated development of UHF&L, K&Q Band Planar Phased Array SATCOM antennas.
  - Initiated construction of lightweight, low signature Multi-function Electromagnetic Radiating System (MERS) antenna that integrates into a compact design the functions of the existing UHF line of sight (LOS) Communications, Joint Tactical Information Distribution System (JTIDS), Combat Direction Finding (DF), and Identification Friend/Foe (IFF) apertures to permit platform space for Cooperative Engagement Concept (CEC).
  - Completed design of an advanced multifunction radio frequency (RF) system which will enable all RF functions: Radar, Communications, and Electronic Warfare to be integrated into common apertures.

- (U) DYNAMIC RECONFIGURABLE SECURE RF NETWORKS: This activity focus on the Navy’s critical need for management of heterogeneous network environments supporting mobile forces and land units in maritime operations.
  - Completed demonstration of a secure, wireless, reconfigurable wireless technology and military security features adapted to shipboard and littoral warfare network environments. Demonstration built on and integrates with Army/Marine Corps wireless networks.

2. (U) FY 2000 PLAN:

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DATE: February 2000

BUDGET ACTIVITY: 3

PROGRAM ELEMENT: 0603794N

PROGRAM ELEMENT TITLE: C3 Advanced Technology

PROJECT: X2091

PROJECT TITLE: (SEW) ADVANCED TECHNOLOGY

- (U) MULTI-FUNCTION APERTURES: This technology addresses a unique Navy need for improved antenna aperture, reduced radar cross-section, and reduced numbers of shipboard antennas.
  - Complete development and land-based demonstration of UHF&L, K&Q Band Planar Phased Array SATCOM antennas.
  - Complete development and land-based demonstration of a lightweight, low signature Multi-function Electromagnetic Radiating System (MERS) antenna that integrates into a compact design the functions of the existing UHF line of sight (LOS) Communications, Joint Tactical Information Distribution System (JTIDS), Combat Direction Finding (DF), and Identification Friend/Foe (IFF) apertures

3. (U) FY 2001 PLAN:

- (U) HIGH ASSURANCE SYSTEMS: The focus of this technology is verification and validation of mission critical systems. Continue the expansion of LSS to add undersea and meteorological and oceanographic information.

- (U) MULTI-FUNCTION APERTURES: This technology addresses a unique Navy need for improved antenna aperture, reduced radar cross-section, and reduced numbers of shipboard antennas.
  - Initiate communications and networking physical layer development for military and commercial SATCOM from S to Ka Band.
  - Complete the receive aperture for the advanced multifunction radio frequency system.
  - Complete the resource allocation manager.

B. (U) PROGRAM CHANGE SUMMARY: See Total Program Change Summary for P.E.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

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PROGRAM ELEMENT: 0603794N
PROGRAM ELEMENT TITLE: C3 Advanced Technology

PROJECT: X2091
PROJECT TITLE: (SEW) ADVANCED TECHNOLOGY

(U) PE 0301567G (Computer Security Program)
(U) PE 0303140N (Information Systems Security Plan)
(U) PE 0601153N (Defense Research Sciences)
(U) PE 0602232N (Space and Electronic Warfare (SEW) Technology)
(U) PE 0602234N (Materials, Electronics and Computer Technology)
(U) PE 0604231N (Tactical Command Systems)

D. SCHEDULE PROFILE: Not applicable

PROJECT NUMBER & TITLE	FY 1999 ACTUAL	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2239 Advanced Targeting (C3I)	5,541	1,776	8,445	3,735	3,390	5,800	5,844	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: As addressed in the Director of Defense, Research and Engineering's Global Surveillance and Communications Thrust, the Precision Sigint Targeting System (PSTS) is a Joint Service/Defense Agency effort to develop and demonstrate the capability to provide tactical users with near-real-time precision targeting information and sensor-to-shooter target updating. The proposed system will enhance the tactical utility and application of existing national assets to provide the tactical commander involved in future conflicts with significant performance improvements, resulting in a total surveillance network which is more responsive to changing world economic and political threats in terms of targeting accuracy, targets of interest and timeliness. PSTS will develop Joint

FY 2000/2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603794N PROJECT: R2239

ADVANCED PROGRAM ELEMENT TITLE: C3 Advanced Technology PROJECT TITLE: TARGETING (C3I)

Service/Defense Agency cooperative precision targeting site enhancements and Global Concept of Operations (CONOPS) for optimal asset cooperative utilization and minimal operational impact. Technical challenges include development of advanced signal processing, data fusion algorithms, exploitation of multiple signal characteristics for target detection and precision geo-location, and modeling and simulation to assure optimal resource allocation for cooperative precision targeting and primary mission performance.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:
   - (U) LOGISTICS SUPPORT: Provided engineering, operations and maintenance support for deployed PSTS systems.
   - Initiated design concepts for advanced multifuction radio frequency (RF) system.

2. (U) FY 2000 PLAN:

   - (U) LOGISTIC SUPPORT: Provide engineering, operations and maintenance support for deployed PSTS systems.

   - (U) ADVANCED MULTIFUNCTION RADIO FREQUENCY SYSTEM: Design the advanced multifunction radio frequency system including all apertures, resource allocation manager and other subsystems. The initial test-bed is focused on the 1 to 5 GHz band including functions such as volume search radar, theater ballistic missile discrimination, Challenge Athena, receive noise jamming, deceptive jamming, and high probability of intercept electronic surveillance. Initial development will begin. The approach, which is applicable to functions at lower and higher frequencies, will provide the Navy with a low cross-section and low life cycle cost approach to the proliferation of apertures and antennae on Naval platforms.

3. (U) FY 2001 PLAN:

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DATE: February 2000

BUDGET ACTIVITY: 3
ADVANCED

PROGRAM ELEMENT: 0603794N
PROGRAM ELEMENT TITLE: C3 Advanced Technology

PROJECT: R2239
PROJECT TITLE:
TARGETING (C3I)

- (U) ADVANCED MULTIFUNCTION RADIO FREQUENCY SYSTEM: Complete the various subsystems and begin the major task of integrating these subsystems into the highly complex advanced multifunction radio frequency system which will have the ability to radiate and receive multiple beams per aperture whose waveform can be either communications, electronic warfare, or radar. Key issues to be addressed include analysis of broadband received signals, partitioning into specific signals and beam forming. The approach, which is applicable to functions at lower and higher frequencies, will provide the Navy with a low cross-section and low life cycle cost approach to the proliferation of apertures and antennae on Naval platforms.

- (U) GLOBAL POSITIONING SYSTEM: Improve antennas, receivers, and signal processing methods employed in GPS thereby making the system less vulnerable to interference. In addition, Hybrid GPS and INS systems will undergo development, and further, methods independent of GPS will be explored. The purpose is to provide Navigational functions with a broad technology base resistant to degrading effects.

B. (U) PROGRAM CHANGE SUMMARY: See Total Program Change Summary for P.E.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Available above SECRET level of classification.

(U) RELATED RDT&E: Available above SECRET level of classification.

D. (U) SCHEDULE PROFILE: Not applicable.